that the implementations or embodiments disclosed herein, in whole or in part, can be equivalently implemented in standard integrated circuits, as one or more computer programs executed by one or more computers (e.g., as one or more programs running on one or more computer systems), as one or more programs executed by on one or more controllers (e.g., microcontrollers) as one or more programs executed by one or more processors (e.g., microprocessors, central processing units, graphical processing units), as firmware, or as virtually any combination thereof, and that designing the circuitry and/or writing the code for the software and or firmware would be well within the skill of one of ordinary skill in the art in light of the teachings of this disclosure.

When logic is implemented as software and stored in memory, logic or information can be stored on any processor-readable medium for use by or in connection with any processor-related system or method. In the context of this disclosure, a memory is a processor-readable medium that is an electronic, magnetic, optical, or other physical device or means that contains or stores a computer and/or processor program. Logic and/or the information can be embodied in any processor-readable medium for use by or in connection with an instruction execution system, apparatus, or device, such as a computer-based system, processor-containing system, or other system that can fetch the instructions from the instruction execution system, apparatus, or device and execute the instructions associated with logic and/or information.

In the context of this disclosure, a "non-transitory processor-readable medium" or "non-transitory computer-readable memory" can be any element that can store the program associated with logic and/or information for use by or in connection with the instruction execution system, apparatus, and/or device. The processor-readable medium can be, for example, but is not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus or device. More specific examples of the processor-readable medium are a portable computer diskette (magnetic, compact flash card, secure digital, or the like), a random-access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory (EPROM, EEPROM, or Flash memory), a portable compact disc read-only memory (CDROM), digital tape, and other non-transitory medium.

The above description of illustrated embodiments, including what is described in the Abstract of the disclosure, is not intended to be exhaustive or to limit the embodiments to the precise forms disclosed. Although specific embodiments and examples are described herein for illustrative purposes, various equivalent modifications can be made without departing from the spirit and scope of the disclosure, as will be recognized by those skilled in the relevant art. The teachings provided herein of the various embodiments can be applied to other portable and/or wearable electronic devices, not necessarily the exemplary wearable electronic devices generally described above.

The invention claimed is:

1. A method of tracking a gaze position of an eye in a target space in a field of view of the eye over an eye tracking period, the method comprising:

performing a plurality of scans of the eye with infrared light within the eye tracking period, each scan comprising:

generating infrared light signals over a scan period; and

projecting the infrared light signals from a number M of virtual light projectors to the eye to form the number M of illumination areas on the eye, wherein the number M>1;

detecting reflections of the infrared light signals from the eye for each scan; and

determining the gaze position of the eye in the target space from the detected reflections of the infrared light signals for each scan, wherein determining the gaze position of the eye in the target space from the detected reflections of the infrared light signals for each scan comprises:

identifying a plurality of glints from the detected reflections of the infrared light signals for the scan, and

determining the gaze position relative to the target space based on the identified plurality of glints.

2. The method of claim **1**, wherein projecting the infrared light signals from the number M of virtual light projectors to the eye to form the number M of illumination areas on the eye comprises directing the infrared light signals from a source of the infrared light signals to an optical scanner over the scan period while controlling the optical scanner through a range of scan positions to deflect each infrared light signal at a respective scan angle.

3. The method of claim **2**, wherein projecting the infrared light signals from the number M of virtual light projectors to the eye further comprises receiving each infrared light signal deflected by the optical scanner at one of the number M of optical elements of an optical splitter, wherein during at least a portion of the scan period each of the number M of optical elements receives a subset of the infrared light signals and redirects each subset of the infrared light signals in a respective direction.

4. The method of claim **3**, wherein projecting the infrared light signals from the number M of virtual light projectors to the eye further comprises receiving each subset of the infrared light signals redirected by each of the number M of optical elements at an optical combiner and redirecting each subset of the infrared light signals by the optical combiner to the eye, thereby forming the respective illumination area.

5. The method of claim **4**, further comprising applying an optical function to at least a portion of the infrared light signals redirected by at least one of the number M of optical elements and received by the optical combiner.

6. The method of claim **5**, wherein applying an optical function to at least a portion of the infrared light signals comprises applying a beam diverging function or a beam converging function to the at least a portion of the infrared light signals.

7. The method of claim **1**, wherein determining the gaze position relative to the target space based on the glint center positions comprises:

applying a mapping function that transforms coordinates from a scan space to the target space to each of the gaze positions to obtain a corresponding intermediate gaze position in the target space; and

combining the intermediate gaze positions to obtain the gaze position in the target space for the scan.

8. The method of claim **7**, further comprising at a select recalibration time during the eye tracking period, adjusting the mapping function to compensate for drifts in the scan space relative to the target space.

9. The method of claim **1**, wherein detecting reflections of the infrared light signals from the eye for each scan comprises detecting reflections of each infrared light signal along at least two different paths.